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Eratyrus mucronatus Stål, 1859 and *Panstrongylus rufotuberculatus* (Champion, 1899) (Hemiptera, Reduviidae, Triatominae): first records in a riverside community of Rio Negro, Amazonas state, Brazil

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Abstract

We report the first records of *Eratyrus mucronatus* Stål, 1859 and *Panstrongylus rufotuberculatus* (Champion, 1899) (Hemiptera, Reduviidae, Triatominae) in a riverside community of the Rio Negro in the Brazilian Amazon. Health promotion activities were carried out with the human population and agents to combat endemic diseases. The entomological findings reinforce the importance of community participation in the surveillance and control of triatomines. Actions to disseminate knowledge on Chagas disease and vectors strengthened the entomological surveillance in the middle Rio Negro.

Key words

Chagas disease, first record, Barcelos, health promotion, triatomines, entomological surveillance

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Introduction

Currently, 153 living and three fossil species are known to belong to the subfamily Triatominae (Reduviidae) (Alevi et al. 2020; Galvão 2020; Zhao et al. 2021). In the Brazilian Amazon, some species of triatomines have been found to be naturally infected by *Trypanosoma cruzi* (Chagas, 1909), including *Eratyrus mucronatus* Stål, 1859, *Microtriatoma trinidadensis* (Lent, 1951), *Triatoma sordida* (Stål, 1859), *Panstrongylus lignarius* (Walker, 1837), *Panstrongylus rufotuberculatus* (Champion, 1899), *Rhodnius brethesi* Matta, 1919, *Rhodnius neglectus* Lent, 1954, *Rhodnius paraensis* Sherlock, Guitton & Miles, 1977, *Rhodnius robustus* Larrousse, 1927, and *Rhodnius montenegrensis* Rosa et al. 2012 (Bilheiros et al. 2018; Coura et al. 2018; Ramos et al.

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2018; Madeira et al. 2020).

Oral transmission in humans linked to the consumption of açaí juice contaminated with *T. cruzi* in the Rio Negro microregion (Amazonas state, Brazil) emphasizes the importance of strengthening the epidemiological surveillance service (Souza-Lima et al. 2013). An outbreak with 17 cases in Santa Isabel do Rio Negro municipality confirmed and seroepidemiological and clinical studies of *T. cruzi* infection using samples from the population, confirm the endemicity of Chagas disease in the region (Brum-Soares et al. 2010; Souza-Lima et al. 2013; Coura et al. 2018).

Health education is an important part of prevention of Chagas disease and improving the human population's general living conditions and overall health. Health knowledge educates the population in changes of behavior which can prevent disease and preserve and improve life (Oliveira and Gonçalves 2004).

The control of Chagas disease in the Brazilian Amazon is predominantly done through educating the general population and healthcare professionals. Technicians in laboratories for diagnosing malaria, need to be trained to diagnose the *T. cruzi* infection. The agents of endemic diseases such as *T. cruzi* should be searched for and triatomines identified. Doctors and nurses need the training to treat the disease (Coura and Junqueira 2015).

We report the first records of *E. mucronatus* and *P. rufotuberculatus* in a riverside community in the Rio Negro microregion, Amazonas.

Methods

Researchers of the Laboratório de Doenças Parasitárias developed health education to disseminate the knowledge about Chagas disease and vectors in the riverside community of Piloto, municipality of Barcelos on the middle Rio Negro, Amazonas state, Brazil (Fig. 1, 2). Health and endemic disease agents participated in all activities.

Information on Chagas disease and its transmission cycle, whether by labor or orally, were developed for extractors of piassava fiber and palm fruits and distributed to the general population. Triatomine diversity, *T. cruzi* transmission modes, and prevention measures were included in this information.

On 15 November 2017, a year after health education had begun in the Piloto, seven specimens of insects, supposedly triatomines, were delivered to the agents. The insects were manually collected near homes in the Piloto community. The specimens were sent to the Laboratório de Doenças Parasitárias at Oswaldo Cruz Institute, Oswaldo Cruz Foundation (Fiocruz), Rio de Janeiro. The specimens were morphologically identified in the Laboratório Interdisciplinar de Vigilância Entomológica

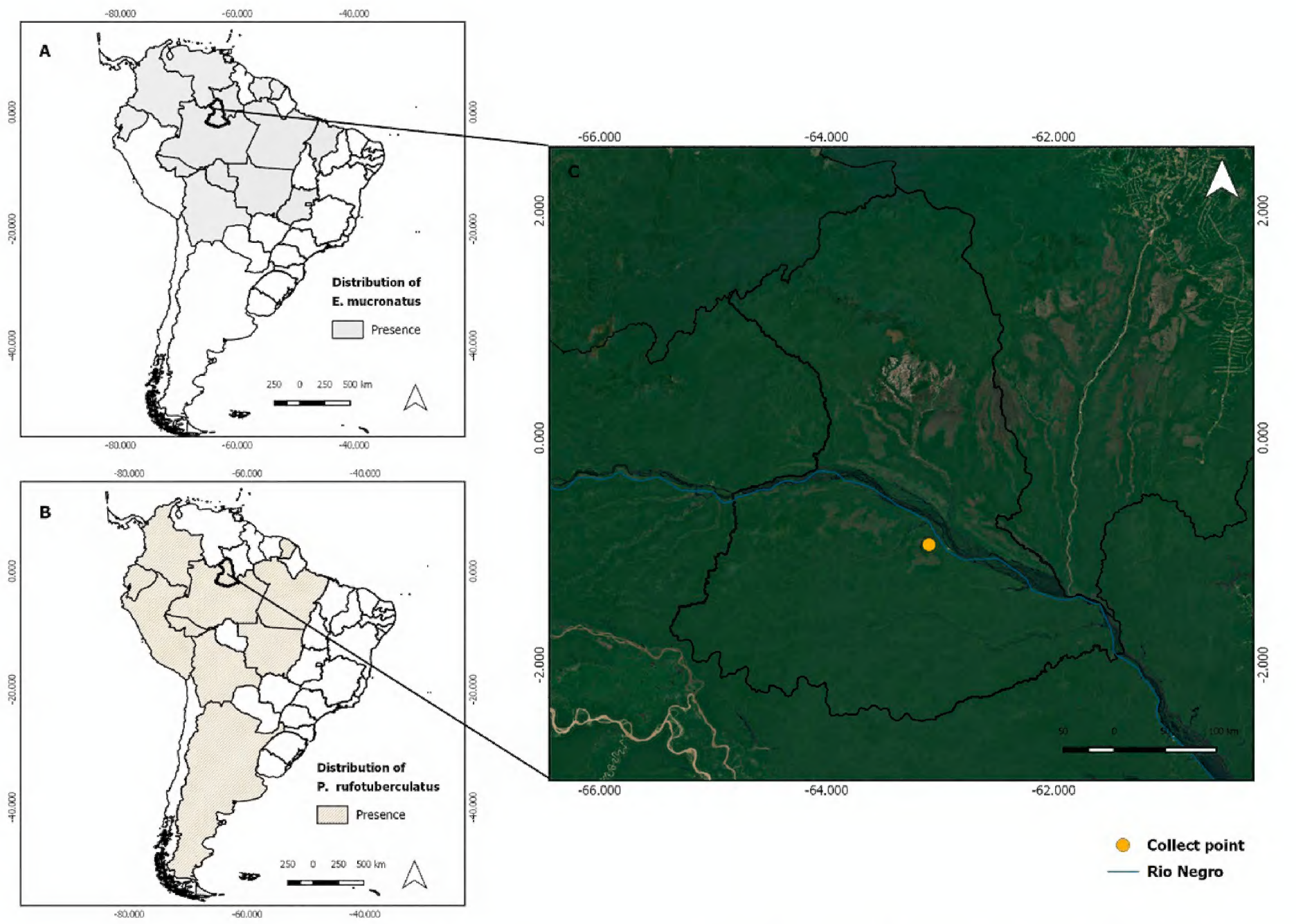

Figure 1. Maps showing the distribution of (**A**) *Eratyrus mucronatus* and (**B**) *Panstrongylus rufotuberculatus*. **C.** Location of the riverside community of Piloto, Barcelos, Amazonas, Brazil.

Figure 2. The riverside community of Piloto, Barcelos, Amazonas, Brazil.

em Diptera e Hemiptera, at Fiocruz using the dichotomous keys by Lent and Wygodzinsky (1979) and Galvão (2014). The triatomines were deposited in the Triatominae Collection at the Oswaldo Cruz Institute (CTIOC).

Results

Eratyrus mucronatus Stål, 1859

New records. BRAZIL – Amazonas • Barcelos, riverside community of Piloto; 00°53.60′S, 062°59.23′W; elev. 43 m; 15.XI.2017; collected by community residents near houses, a place with several species palm trees; 1 ♂, CTIOC 12348.

Identification. In the genus *Eratyrus* Stål, 1859 the main characters used for identification were the head eyes longer than wide; antennae inserted away from the apex of the head and eyes; ocelli situated on sharp protrusions of the disc in the post-ocular region of the head and very long, oblique, spine-shaped scutellum. The species was determined by having the anterior pronotum lobe with a robust dorsal thorn, humeri of the pronotum with sharply spiny angles, and corium with a small, reddish, subapical spot (Fig. 3).

Panstrongylus rufotuberculatus (Champion, 1899)

New records. BRAZIL – Amazonas • Barcelos, riverside community of Piloto; 00°53.60′S, 062°59.23′W; elev. 43 m; 15.XI.2017; collected by community residents near the houses, a place with several species palm trees; 1 ♂, CTIOC 12347.

Identification. The genus *Panstrongylus* Berg, 1879 was identified by the position of the antennae, which are inserted close to the eyes. The species was identified by the golden bristles on the dorsal surface of the body;

Figure 3. *Eratyrus mucronatus* Stål, 1859, male, dorsal view.

Figure 4. *Panstrongylus rufotuberculatus* (Champion, 1899), male, dorsal view.

anterior lobe of the pronotum with reddish tubers; short scutellum, which may be rounded, conical, or truncated at its tip; connexival segments with central dark spots; and light-green anterior wings (Fig. 4).

Discussion

Eratyrus mucronatus occurs in the Brazilian states of Amazonas, Acre, Pará, Rondônia, Roraima, Maranhão, Goiás, and Mato Grosso, and extends to Colombia, Bolivia, Ecuador, French Guiana, Suriname, and Venezuela (Meneguetti et al. 2011; Obara et al. 2013; Monte et al. 2014; Gama Neto et al. 2020). It occurs in wild habitats and is generally associated with nests of Xenartha, Didelphidae, and Chiroptera in palms as well as in sympatry with colonies of *Triatoma maculata* (Erichson, 1848) and *Cavernicola pilosa* Barber, 1937 (Dias et al. 1942; Guerrero et al. 1981; Vivas et al. 2001). The natural infection of this species has already been recorded (Sherlock et al. 1997). Its first occurrence in Brazil was reported in the Ouro Preto do Oeste municipality, Rondônia state, in a wild environment of the Comissão Executiva do Plano da Lavoura Cacaueira reserve (Meneguetti et al. 2011). The triatomines captured in Acre were collected inside a home located in a secondary forest in a peri-urban area with palms and cattle (Obara et al. 2013).

Panstrongylus rufotuberculatus has been found in Mexico, Costa Rica, Panama, French Guiana, Colombia, Venezuela, Ecuador, Peru, Bolivia, and Argentina (Salomón et al. 1999; Galvão 2014). In Brazil, has been found in Acre, Amazonas, Pará, and Mato Grosso (Galvão 2014; Oliveira et al. 2019). The first specimen captured in Amazonas was at the mouth of the Rio Preto, a tributary of Rio Unini, part of the Rio Negro basin (Almeida and Santos 1973). However, infection of *P. rufotuberculatus* with *T. cruzi* has already been reported (Sousa et al. 1983; Salomón et al. 1999). Miles (1979) found specimens associated with opossums in the Brazilian Amazon; Cálderon et al. (1985) observed intra-domiciliary colonies, and Castro et al. (2010) reported the invasion of homes by adults that were attracted by the lights.

Health education builds popular participation in health services (Oliveira and Gonçalves 2004). Some studies point to an integrated action with the community, involving educational activities to guarantee the continuity of actions and strengthen the epidemiological and entomological surveillance (Falavigna-Guilherme et al. 2002; Mello et al. 1992).

We corroborate Abad-Franch et al. (2011), who emphasized the importance of encouraging public participation in insect collection. Using lectures, the human population was empowered with information on the vectors of *T. cruzi*, transmission modes, and prevention of the disease. Endemic disease agents had no knowledge of previous reports of *E. mucronatus* and *P. rufotuberculatus* in region. We suggest that dissemination of information continues in the Rio Negro microregion. Such information reinforces entomological surveillance and supports a deeper knowledge of the region's triatomine fauna.

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Authors' Contributions

ACS and ACVJ developed the health promotion activities in the Piloto community. ACS, CML, and JRC wrote the manuscript; CML identified the triatomine specimens.

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